

REMARKS

Claims 1, 4, 6-16, 18, 19, 21, 22, 24-57, and 60-78 are pending in the application.

35 U.S.C. §§ 102 & 103 Rejections

Claims 1, 4, 6-16, 18-19, 21-22, 24-57, and 60-78 stand rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 5,985,469 to Kurakata et al. (hereinafter "Kurakata").

Process claims 16, 29, 32 and 35 have been amended herein to further define the features of the present invention. These claims now state that the carburized hardened layer of the invention is obtained by gas carburizing in a carburizing gas atmosphere containing carbon monoxide at 400° to 500°C so that carbon is diffused into the structure so as to form a solid solution and thus prevent the formation of crystalline chromium.

The purpose of the present invention is to provide a decorative item that includes a stainless steel basis material having a high surface hardness, i.e., greater scratch resistance, than that of conventional decorative items, while maintaining corrosion resistance inherent in stainless steel.

The purpose described above was achieved by adopting a carburized hardened layer extending from a surface of the basis material to an arbitrary depth wherein carbon is diffused so as to form a solid solution in which crystalline chromium carbide is not formed; and further, at least one hard coating is disposed on a surface of the carburized hardened layer of the basis material. The hard coating has a surface hardness greater than that of the carburized layer.

Further, it was found that such a decorative item can be achieved by adopting the specific process as claimed.

Kurakata discloses a white decorative part comprising: a substrate, a white hard coating formed on the substrate according to a dry plating process, and an outermost coating formed on the white hard coating according to a dry plating process. The white hard coating is composed of either a nitride, a carbide, an oxide or a carbonitride of at least one element selected from among Ti, Hf, Zr, Ta, V, Cr and Al or Ti. The outermost coating is composed of an alloy of gold and any of nickel, tantalum, cobalt, palladium, silver, rhodium, titanium and iron.

The Examiner states that Kurakata "discloses the claimed steel surface hardened and with a layer of the claimed carbide and over layer made by the claimed process." However, there are clear differences between the present invention and what is disclosed in Kurakata. For example:

1.) The Forming Process: The white decorative part disclosed in Kurakata has a layered structure including a substrate, a white hard coating, and an outermost coating. Between the substrate and the white hard coating, a metal coating is disposed. In the present invention, the decorative item has a structure that includes a stainless steel base and a hard coating. The surface of the base material itself is carburized to an arbitrary depth from the surface of the base material where the carbon is diffused so as to form a solid solution in which crystalline chromium carbide is not formed, thereby forming a carburized hardened layer.

2.) The Location: The undercoating disclosed in Kurakata is layered on the substrate surface. In the present invention, the carburized hardened layer of the invention is formed as an internal part of the base material surface to an arbitrary depth as shown in the figures in the specification.

3.) The Composition: The undercoating disclosed in Kurakata is selected from a Ni coating, a Ni alloy coating, a Cr coating, a Pd coating, a laminate of Ni alloy and Cr coatings, a laminate of Ni and Cr coatings, a laminate of Ni alloy and Pd coatings, a laminate of Ni and Pd coatings, a Cu-Sn alloy coating, and Cu-Sn-Pd alloy coatings. The undercoating is formed on the substrate according to a wet plating process (see column 4, lines 14-31 of Kurakata). In the present invention, the carburized layer of the invention includes the same elements of the stainless steel base, such as Fe-Cr-Ni-Mo or Fe-Cr-Mn, and carbon in the form of a solid solution.

In conclusion, the white decorative part disclosed by Kurakata and the decorative item of the present invention have completely different structures when compared to each other. Kurakata does not in any way anticipate or suggest the present invention. Therefore, the rejection of claims 1, 4, 6-16, 18-19, 21-22, 24-57, and 60-78 under 35 U.S.C. § 102(e) should be withdrawn.

Claims 1, 4, 6-15, 19, 21-22, 24-28, 38-44, 61-63, and 70-78 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent No.

51059732 to Suwa (hereinafter "Suwa") or Japanese Patent No. 56008004 to Glory KK (hereinafter "Glory KK") or Japanese Patent No. 62199765 to Daido Tokushuko KK (hereinafter "Daido Tokushuko KK"). Also, claims 16, 18, 29-37, 45-57, 60, and 64-69 stand rejected under 35 U.S.C. § 103(a) as being obvious over Suwa or Glory KK or Daido Tokushuko KK in view of JP09071854 or United States Patent Nos. 5,792,282 or 5,593,510 or 5,556,483 to Daido Hoxan Inc. (hereinafter "Daido Hoxan").

Suwa discloses an external timepiece part having double carbide layers that include a carbide layer formed on the part by a carburizing treatment and a metallic carbide layer of excellent corrosion resistance formed on the carbide layer.

However, Suwa does not disclose, teach, or suggest the presently claimed decorative item and the effectiveness thereof. For example, Suwa does not disclose or suggest a carburized hardened layer in which crystalline chromium carbide is not formed, or a hard coating disposed over the carburized hardened layer, where the hard coating has a surface hardness greater than that of the carburized layer, as is presently claimed.

Daido Tokushuko KK discloses a material for high surface pressure structural parts by successfully subjecting a steel material containing specific ratios of C, Si, Mn, Al, N, and Fe (claim 1); C, Si, Mn, Al, N, Ni ($\leq 5.0\%$), Cr ($\leq 5.0\%$), Mo, and Fe (claim 2); C, Si, Mn, Al, N, Ni ($\leq 5.0\%$), Cr ($\leq 5.0\%$), Mo ($\leq 0.8\%$), V, Ti, Nb, Zr, and Fe (claim 3) to a carburization treatment and chemical vapor deposition treatment to form a hard layer. In fact, the steel material is carburized before forming a TiC or a tin hard layer. However, the steel material of Daido Tokushuko KK and the stainless steel base material of the invention are completely different regarding the amount of and the specific elements contained therein.

Additionally, the materials in Daido Tokushuko KK are used as machine structural parts for large gears, etc. The present invention is directed to articles, which are small in size, such as decorative items on the exterior part of a timepiece, wristwatch bands, bezels, casings, back lids or dials, etc. Thus, the technology in Daido Tokushuko KK is unrelated to the decorative item of the invention and they are completely different from each other with respect to their structure and their respective fields of application.

Glory KK discloses stainless steel subjected to a carburization, nitriding, or carbo-nitriding treatment and subsequently coated with titanium nitride, titanium carbide, or titanium carbonitride. For example, a watchcase or a watchstrap having a hard layer, where the surface of stainless steel is coated with titanium nitride, titanium carbide, or titanium carbonitride and a process for producing a watchcase and a watchstrap that includes carburizing, nitriding, or carbonitriding a stainless steel with titanium nitride, titanium carbide, or titanium carbonitride.

However, the watchcase and watchstrap disclosed by Glory are completely different in their structure from the presently claimed decorative item. For example, Glory does not disclose or suggest a carburized hardened layer in which crystalline chromium carbide is not formed, or a hard coating disposed over the carburized hardened layer, where the hard coating has a surface hardness greater than that of the carburized layer, as is presently claimed.

Further, none of Suwa, Seikosha, Glory KK, and/or Daido Tokushuko KK disclose or suggest a carburized hardened layer in which crystalline chromium carbide is not formed, or a hard coating disposed over the carburized hardened layer, where the hard coating has a surface hardness greater than that of the carburized layer.

The Examiner indicates that Suwa or Glory KK or Daido Tokushuko KK discloses the claimed steel surface hardened and with a layer of the claimed carbide and over the layer made by the claimed process. The hardness relationship between the hard coating and carburized layer is not an inherent property. Various combinations can be considered when including one of the various base materials and one of the various hard coatings. However, it cannot be said that all combinations satisfy a desired hardness relationship that the hard coating has a surface hardness greater than that of the carburized layer as claimed.

Applicants sought to provide a decorative item, which has a high surface hardness, i.e., greater scratch resistance than that of conventional decorative items, while maintaining corrosion resistance, an inherent property of stainless steel. Applicants achieved this aim by providing a carburized hardened layer extending from a surface of a base material to an arbitrary depth where carbon is diffused so as to form a solid solution in which crystalline chromium carbide is not formed. Additionally, at least one hard coating is disposed on a surface of the

hardened carburized layer of the base material where the hard coating has a surface hardness greater than that of the carburized layer.

None of the cited references discloses all of the limitations recited in the present claims. The presumption that a claimed product may be within the broad field of the prior art and one may arrive at it by selecting specific combinations does not render the product obvious in the absence of some directions or reasons for making such a selection. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F3d 1308, 50 U.S.P.Q.2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references).

The Examiner's attention is also called to the fact that Applicants' claimed carburizing step is carried out at 400° to 500°C whereas: (a) the carburizing temperature of Suwa is 1040°C (see Example 1 of Suwa, partial translation previously submitted); (b) the carburizing temperature of Glory KK is 800°C (see attached Fig. 4 of Glory); and (c) the carburizing temperature of DadoTokushuko KK is from 900° to 950°C (see attached Table 2 of Dado). The lower carburizing temperature of 400° to 500°C of Applicants' process precludes the formation of crystalline chromium.

Moreover, the assertion that the hardness relationship between the hard coating and the carburized layer would be inherent in the products of the prior art is not supported and does not overcome the deficiency of the cited references. The present invention is not anticipated by Suwa, Glory KK, or Daido Tokushuko KK. Also the present invention is not obvious over any of Suwa or Glory KK or Daido Tokushuko KK in view of Daido Hoxan taken alone or in any combination. Therefore, the rejections under 35 U.S.C. §§ 102(b) and 103(a) should be withdrawn.

Finally, Applicants assert that claims 38-44 and 45-57 represent a patentable advance since there is absolutely no teaching or suggestion in the cited prior art concerning the subject matter defined in those claims. The Examiner's reconsideration is respectfully requested.


Conclusion

Applicants assert that claims 1, 4, 6-16, 18-19, 21-22, 24-57, and 60-78 are in form for allowance.

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Attorney Docket No. 1217-010737

In view of the above remarks, reconsideration of the rejections and allowance of claims 1, 4, 6-16, 18, 19, 21, 22, 24-57 and 60-78 are respectfully requested.

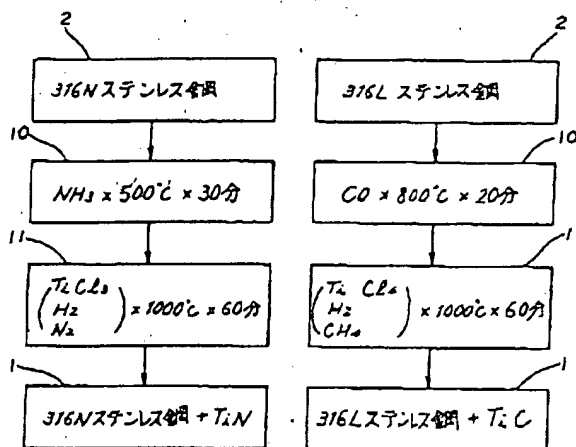
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第3図

第4図



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TC 1700

Glory KK

Daido Tokushuko KK

Carburizing
Temperature

第 2 表

区 分	No.	材料 記号	炭化 温度 (℃)	化学的炭化処理		炭化層の性質			
				炭化層	炭化温度 (℃)	表面硬さ (Hv)	炭化から0.05mmの 硬さ(Hv)	心部硬さ (Hv)	有効炭化層 深さ(mm)
本発明(1)	1	A	925	TiC	900	3500	730	375	0.51
	2	B	"	TiN	"	2230	753	403	0.73
	3	C	900	TiC+TiN	"	2850	740	426	0.88
	4	D	950	TiC	850	3420	758	421	0.85
	5	E	"	TiN	"	2700	724	458	1.05
比較例	6	C	925	—	—	735	753	420	0.90
	7	C	950	TiC	850	3480	685	421	0.36
本発明(2)	8	F	900	TiC	900	3570	752	394	0.63
	9	G	"	TiN	"	2180	737	435	0.84
	10	H	925	TiC+TiN	925	2770	755	406	0.81
	11	I	"	"	"	2530	746	429	1.10
	12	G	925	—	—	705	732	424	0.86
比較例	13	H	950	TiC+TiN	850	2640	683	421	0.35

Examples

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TC 1700

Daido Tokushuko KK

第 3 表

区 分	No.	材料記号	ローラーピッチングB ₁₀ 割合(×10 ⁴ %)	シャルピー硬度値(kgf·n/cm ²)
本発明(1)	1	A	8.1	5
	2	B	9.4	6
	3	C	16	8
	4	D	23	8
	5	E	22	5
比較例	6	C	9.3	10
	7	C	1.5	8
本発明(2)	8	F	9.5	10
	9	G	8.8	10
	10	H	16	12
	11	I	28	7
	12	G	3.6	13
比較例	13	H	2.0	